IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Brian Patterson	Examiner: Lev Iwashko
Serial No.:	10/759,772	Group Art Unit: 2186
Filed:	January 14, 2004	Docket No.: 200300056-1
Title:	Process Job Flow Analysis	Confirmation No.: 8135

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Appeal Brief is filed in response to the Final Office Action mailed July 3, 2006 and Notice of Appeal filed August 28, 2006.

AUTHORIZATION TO DEBIT ACCOUNT

It is believed that no extensions of time or fees are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required (including fees for net addition of claims) are hereby authorized to be charged to Hewlett-Packard Development Company's deposit account no. 08-2025.

I. REAL PARTY IN INTEREST

The real party-in-interest is the assignee, Hewlett-Packard Company, a Delaware corporation, having its principal place of business in Palo Alto, California.

II. RELATED APPEALS AND INTERFERENCES

There are no known related appeals or interferences known to appellant, the appellant's legal representative, or assignee that will directly affect or be directly affected by or have a bearing on the Appeal Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1 – 26 stand finally rejected. The rejection of claims 1 – 26 is appealed.

IV. STATUS OF AMENDMENTS

No amendments were made after receipt of the Final Office Action. All amendments have been entered.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The following provides a concise explanation of the subject matter defined in each of the claims involved in the appeal, referring to the specification by page and line number and to the drawings by reference characters, as required by 37 C.F.R. § 41.37(c)(1)(v). Each element of the claims is identified by a corresponding reference to the specification and drawings where applicable. Note that the citation to passages in the specification and drawings for each claim element does not imply that the limitations from the specification and drawings should be read into the corresponding claim element or that these are the sole sources in the specification supporting the claim features.

Claim 1

A storage device (Fig. 2, 115) comprising:

a controller (Fig. 2, 205) configured to receive jobs from a source (Fig. 1, 110/120; p. 5, lines 4-17)

a set of components (Fig. 2, 225-235) that receive, complete, and pass on jobs (p. 6, line 1 – p. 7, line 29); and

job flow analysis devices (Fig. 2, 280/282) configured to the controller to track the number of jobs received, completed, and passed on by each component, wherein the controller compares the number of jobs received with a sum of the number of jobs completed and passed on by each component (p. 8, line 1 – p. 9, line 8; p. 9, line 22 – p. 11, line 25).

Claim 2

The storage device of claim 1 wherein the controller is further configured to perform a corrective action on the storage device and request from the source the jobs when the number of jobs received is greater than a sum of a threshold amount plus the number of jobs completed and passed on by one of the components (p. 11, lines 13-25).

Claim 3

The storage device of claim 1 wherein the set of components are arranged serially (Fig. 2: p. 6, lines 1-25).

Claim 4

The storage device of claim 1 wherein the job flow analysis devices are comprised of job logs (Fig. 2, 282) to record jobs received, completed, and passed on (p. 8, lines 1-12).

Claim 5

A method comprising:

determining a number of jobs received, completed, and passed on by a process (Fig. 6, 605: p. 15, lines 11-22);

comparing the number of jobs received by the process and a sum of the number of jobs completed and passed on by the process (Fig. 6, 610/615: p. 15, line 23 – p. 16, line 12);

deciding whether the sum of a threshold amount and of the number of jobs completed and passed on is greater than the number of jobs received (Fig. 6, 620: p. 16, lines 13-26); and

performing a corrective action when the sum of the threshold amount and the number of jobs completed and passed on versus the number of jobs received is not acceptable (Fig. 6, 635/640: p. 17, lines 13-24).

Claim 6

The method of claim 5 wherein the comparing is performed over a common time period during which the numbers of jobs are received, completed, and passed on by the process (p. 16, line 27 – p. 17, line 12).

Claim 7

The method of claim 5 wherein the determining is performed by a counter for the jobs received, a counter for the jobs completed, and a counter for the jobs passed on (p. 16, lines 3-12).

Claim 13

A storage device comprising:

a series of processes (Fig. 3, 305-315) configured to count jobs received, completed, and passed on by each process (p. 9, line 22 – p. 10, line 26);

a set of counters (Fig. 3, 355-385) to track numbers of jobs received, completed, and passed on by each process in the series of processes (p. 10, line 27 – p. 11, line 5; and

a controller (Fig. 2, 205) that compares from the counters the number of jobs received versus the sum of the number of jobs completed and passed on by each process (p. 8, line 1 – p. 9, line 8; p. 9, line 22 – p. 11, line 25; p. 11, lines 13-25).

Claim 14

The storage device of claim 13 wherein the set of counters are comprised of job logs (Fig. 2, 282) to record particular jobs received, completed, and passed on at each counter (p. 8, lines 1-12).

Claim 18

A processor-readable medium comprising processor-executable instructions for analyzing job flow in a process, the processor-executable instructions comprising instructions for:

tracking a number of jobs received, jobs completed, and jobs passed on by the process (p. 10, line 27 – p. 11, line 5;

comparing the number of jobs received by the process with the number of jobs completed and passed on the process (p. 11, lines 13-25); and

determining a discrepancy whenever the number of jobs received by the process exceeds the number of jobs completed and passed on the process (p. 17, lines 13-24).

Claim 24

A storage device comprising:

means for counting a number of jobs received, completed, and passed on by processes in a controller of the storage device (Fig. 3, 355-385; p. 10, line 27 – p. 11, line 5;

means for determining if a number of jobs completed and passed on is sufficient for a number of jobs received by each process (Fig. 2, 205; p. 8, line 1 – p. 9, line 8; p. 9, line 22 – p. 11, line 25; p. 11, lines 13-25);

means for resetting the processes (Fig. 2, 205; p. 17, lines 18-24); and

means for requesting for the jobs to be resent to the processes (Fig. 2, 205; p. 17, lines 18-24).

Claim 25

The storage device of claim 24 wherein the means for counting comprises a job log (Fig. 2, 282) for jobs received, completed, and passed on by each process (p. 8, lines 1-12).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

I. Claims 1 – 8, 10 – 17, and 24 – 25 are rejected under 35 USC § 102(b) as being anticipated by USPN 5,974,502 (DeKoning).

II. Claims 9 and 26 are rejected under 35 USC § 103(a) as being unpatentable over DeKoning in view of USPN 5,166,927 (Iida).

III. Claim 18 is rejected under 35 USC § 103(a) as being unpatentable over DeKoning in view of USPN 5,459,866 (Akiba).

IV. Claims 19 – 23 are rejected under 35 USC § 103(a) as being unpatentable over DeKoning in view of Akiba.

VII. ARGUMENT

The rejection of claims 1 – 26 is improper, and Applicants respectfully requests withdraw of this rejection.

The claims do not stand or fall together. Instead, Applicants present separate arguments for various independent and dependent claims. Each of these arguments is separately argued below and presented with separate headings and sub-heading as required by 37 C.F.R. § 41.37(c)(1)(vii).

Overview of DeKoning

As a precursor to the arguments, Applicants provide an overview of DeKoning. This overview will assist the Board of Appeals in determining that DeKoning is not related to the elements of the pending claims and thus does not teach or suggest all the elements of claims 1 – 26.

As discussed in DeKoning, RAID (redundant array of inexpensive disks) systems are widely used in mass storage systems. Generally, a disk controller coordinates transfer of data between a host computer and an array of storage disks (see DeKoning at 1: 65-7). In order to increase the efficiency of the disk controller, DeKoning divides or splits-up the I/O (input/output) requests from the host computer to the controller (3: 51-55). The divided I/O requests are smaller and more manageable for processing (3: 53-55). The **size** of the I/O request is important for DeKoning: "the invention keeps only a limited number of these smaller individual I/O requests 'active' at any particular time so that a single large I/O request cannot preclude other I/O requests from making progress in the controller" (3: 57-60).

I. Claim Rejections: 35 USC § 102(b)

Claims 1 – 8, 10 – 17, and 24 – 25 are rejected under 35 USC § 102(b) as being anticipated by USPN 5,974,502 (DeKoning). Applicants respectfully traverse.

A proper rejection of a claim under 35 U.S.C. §102 requires that a single prior art reference disclose each element of the claim. See MPEP § 2131, also, *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 U.S.P.Q. 303, 313 (Fed. Cir. 1983).

Since DeKoning neither teaches nor suggests each element in the claims, these claims are allowable over DeKoning.

Claim 1

As one example, claim 1 recites a controller that receives jobs from a source. The claim then recites job flow analysis devices that track "the number" of jobs received, completed, and passed on. Nowhere does DeKoning teach a device that tracks **the number** of jobs. By contrast, DeKoning teaches a controller that tracks "the size" of jobs, not number of jobs.

The Office Action cites column 6, lines 22-39 that is directed to Fig. 3. This section of DeKoning teaches a request size calculation unit (RSCU) 54, a comparator 56, and a controller 44. The RSCU receives I/O requests from the host and then calculates the amount (i.e., the size) of data "which each I/O request requires to be transferred between the host 42 and the array 46" (6: 38-33). DeKoning emphasizes that the controller calculates the size of the I/O requests, not the number of I/O requests:

> The comparator 56 receives a signal from the RSCU 54 **indicative of the size** of a current request and compares **the size** of the current request to a LARGE I/O SIZE parameter received from the RCFU 52. The LARGE I/O **SIZE** parameter represents the largest single I/O request which will be processed by the RCFU 52 of the present invention… (emphasis added: 6: 33-38).

In short, DeKoning does not teach a controller or device that tracks the number of jobs as recited in claim 1. Anticipation under section 102 can be found only if a single reference shows exactly what is claimed. Titanium Metals Corp. v. Banner, 778 F.2d 775, 227 U.S.P.Q. 773 (Fed. Cir. 1985).

For at least these reasons, claim 1 and its dependent claims are allowable over DeKoning.

As a second example, claim 1 recites job flow analysis devices that track the number of jobs "received, completed, and passed on by each component." In other words,

claim 1 recites devices that track a number of (1) jobs received, (2) jobs completed, and (3) jobs passed on. Nowhere does DeKoning teach devices that track jobs received and completed and passed on. By contrast, DeKoning teaches a controller that tracks "the size" of jobs, not number of jobs received, completed, and passed on.

The Office Action cites column 6, lines 22-39 that is directed to Fig. 3. This section of DeKoning teaches devices that track a "size" of an I/O request. The RSCU receives I/O requests from the host and then calculates the amount (i.e., the size) of data "which each I/O request requires to be transferred between the host 42 and the array 46" (6: 38-33). DeKoning emphasizes that the controller calculates the size of the I/O requests, not the number of I/O requests (see column 6, lines 33-38 quoted above from DeKoning).

In short, DeKoning does not teach a controller or device that tracks three different aspects: the number of jobs "received, completed, and passed on by each component." For a prior art reference to anticipate under section 102, every element of the claimed invention must be identically shown in a single reference. In re Bond, 910 F.2d 831, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990).

For at least these reasons, claim 1 and its dependent claims are allowable over DeKoning.

As a third example, claim 1 recites a controller that "compares the number of jobs received with a sum of the number of jobs completed and passed on by each component." In other words, the controller performs a comparison between (1) the number of jobs received and (2) a sum of the number of jobs completed and passed on by each component. Nowhere does DeKoning teach a controller that compares these claim elements. Instead, DeKoning teaches a controller that tracks "the size" of I/O requests.

The Office Action cites column 7, lines 1-51 and 55-56. These sections of DeKoning teach how to optimize the throughput in the controller by adjusting or tuning the size of the I/O requests. In one embodiment, DeKoning uses a static approach wherein optimal values for LARGE I/O SIZE and NCLIOP are stored for every possible combination of host channel speed, drive channel speed, XOR engine speed, etc. (see column 7, line 52 – column 8, line 12). In another embodiment, DeKoning teaches a dynamic approach (see column 8, lines 13 +).

In column 7, DeKoning provides details how its microprocessor allocates memory space, controls data transfer between the host and buffer, and performs other standard processing functions. Regardless, nowhere does column 7 teach that a controller performs a comparison between two specific elements: (1) the number of jobs received and (2) a **sum of the number of jobs completed and passed on** by each component.

In short, DeKoning does not teach a controller that performs a comparison of the elements recited in claim 1. In order for a prior art reference to be anticipatory under 35 U.S.C. § 102 with respect to a claim, "[t]he elements must be arranged as required by the claim," see M.P.E.P. § 2131, citing *In re Bond*, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990).

For at least these reasons, claim 1 and its dependent claims are allowable over DeKoning.

Claim 2

Claim 2 recites that the controller performs a corrective action on the storage device and requests information from the source. Specifically, the controller requests from the source "when the number of jobs received is greater than a sum of a threshold amount **plus the number of jobs completed and passed on by one of the components**" (emphasis added). In other words, claim 2 recites a specific instance when the controller makes a request: The number of jobs received is greater than the sum of (1) a threshold amount and (2) number of jobs completed and passed on. DeKoning does not teach these specific elements.

The Office Action cites column 6, lines 47-52. These sections of DeKoning teach that when the size of the I/O request is smaller than LARGE I/O SIZE parameter, deliver the request (but do not divide the request). However, when the size of the I/O request is greater than LARGE I/O SIZE parameter, deliver and divide the request. In short, DeKoning teaches to divide or not divide a request based on whether the request is larger or smaller than a parameter or threshold (i.e., the LARGE I/O SIZE). Notice that nowhere does DeKoning teach that the decision to deliver and/or divide is based on "when the number of jobs received is greater than a sum of a threshold amount **plus the number of jobs completed and passed on by one of the components**."

For at least these reasons, claim 2 is allowable over DeKoning.

Claim 3

Claim 1 recites a set of components that receive, complete, and pass on jobs. Dependent claim 3 then recites that these components are "arranged serially." DeKoning does not teach these elements.

In rejecting claim 1, the Office Action cites the host 42 as being the claimed "source." Then, in rejecting the different elements of claim 3, the Office Action again cites the host of DeKoning. In other words, the Office Action cites host 42 as being one element of claim 1, then cites host 42 as being another, completely different element of claim 3. Claims 1 and 3 recite separate and different elements of "set of components" and "source." The Office Action cannot use the same element in DeKoning to satisfy these different elements.

For at least these reasons, claim 3 is allowable over DeKoning.

Claim 4

Claim 4 recites that the job flow analysis devices comprise "job logs to record jobs received, completed, and passed on." Nowhere does DeKoning teach job logs performing these recited functions.

The Office Action cites column 6, lines 22-26. This section of DeKoning teaches a request size calculation unit (RSCU) 54 that "is operative for receiving I/O requests from the host computer 42 via I/O request line 48 and for calculating the amount of data which each I/O request requires to be transferred between the host 42 and the array 46" (6: 29-34). Notice that nowhere does DeKoning state that the RSCU records "jobs received, completed, and passed on."

For at least these reasons, claim 4 is allowable over DeKoning.

Claim 5

As a first example, claim 5 recites a method that includes determining "a number of jobs received, completed, and passed on by a process." In other words, the claim recites determining a number for (1) jobs received, (2) jobs completed, and (3) jobs

passed on. Does DeKoning teach determining all three of these numbers? DeKoning does not.

The Office Action cites column 6, lines 28-32 that is directed to Fig. 3. This section of DeKoning teaches devices that track a "size" of an I/O request. The RSCU receives I/O requests from the host and then calculates the amount (i.e., the size) of data "which each I/O request requires to be transferred between the host 42 and the array 46" (6: 38-33). DeKoning emphasizes that the controller calculates the size of the I/O requests, not the number of I/O requests as recited in claim 5.

In short, DeKoning does not teach a controller or device that determines the number of jobs "received, completed, and passed on by each component." For a prior art reference to anticipate under section 102, every element of the claimed invention must be identically shown in a single reference. In re Bond, 910 F.2d 831, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990).

For at least these reasons, claim 5 and its dependent claims are allowable over DeKoning.

As a second example, claim 5 recites "comparing the number of jobs received by the process and a sum of the number of jobs completed and passed on by the process." In other words, a comparison is made between (1) the number of jobs received and (2) a sum of the number of jobs completed and passed on by each component. Nowhere does DeKoning teach a controller or any device that compares these claim elements. Instead, DeKoning teaches a controller that tracks "the size" of I/O requests.

The Office Action cites column 6, lines 32-35. This section of DeKoning teaches that the RSCU receives an I/O request and calculates "the amount of data which each I/O request requires to be transferred between the host 42 and array 46." Nowhere does DeKoning teach that the RSCU compares (1) the number of jobs received and (2) a sum of the number of jobs completed and passed on by each component.

For at least these reasons, claim 5 and its dependent claims are allowable over DeKoning.

As a third example, claim 5 recites "deciding whether the sum of a threshold amount and of the number of jobs completed and passed on is greater than the number of jobs received." In other words, claim 5 recites a specific decision: The number of jobs

received is greater than the sum of (1) a threshold amount and (2) number of jobs completed and passed on. DeKoning does not teach these specific elements.

The Office Action cites column 6, lines 45-47. This and surrounding sections of DeKoning teach that when the size of the I/O request is smaller than LARGE I/O SIZE parameter, deliver the request (but do not divide the request). However, when the size of the I/O request is greater than LARGE I/O SIZE parameter, deliver and divide the request. In short, DeKoning teaches to divide or not divide a request based on whether the request is larger or smaller than a parameter or threshold (i.e., the LARGE I/O SIZE). Notice that nowhere does DeKoning teach that the decision to deliver and/or divide is based on "when the number of jobs received is greater than a sum of a threshold amount **plus the number of jobs completed and passed on by one of the components**."

For at least these reasons, claim 5 and its dependent claims are allowable over DeKoning.

As a fourth example, claim 5 recites performing a corrective action. The action is performed "when the sum of the threshold amount and the number of jobs completed and passed on versus the number of jobs received is not acceptable." DeKoning does not teach these elements.

The Office Acton cites column 6, lines 47-52. This section of DeKoning teaches that when the size of the I/O request is smaller than LARGE I/O SIZE parameter, deliver the request (but do not divide the request). However, when the size of the I/O request is greater than LARGE I/O SIZE parameter, deliver and divide the request. In short, DeKoning teaches to divide or not divide a request based on whether the request is larger or smaller than a parameter or threshold (i.e., the LARGE I/O SIZE). Notice that nowhere does DeKoning teach that the decision to deliver and/or divide is based on "when the sum of the threshold amount and the number of jobs completed and passed on versus the number of jobs received is not acceptable."

For at least these reasons, claim 5 and its dependent claims are allowable over DeKoning.

Claim 6

Claim 6 recites that the comparing "is performed over a common time period during which the numbers of jobs are received, completed, and passed on by the process." The Office Action cites column 6, lines 55-60 of DeKoning. This section of DeKoning merely teaches that the NCLIOP is the number of block requests that are active in the RCFU. This teaching has nothing whatsoever to do with claim 6.

For at least these reasons, claim 6 is allowable over DeKoning.

Claim 7

Claim 7 recites that the determining is performed by (1) a counter for the jobs received, (2) a counter for the jobs completed, and (3) a counter for the jobs passed on. DeKoning does not teach each of these three counters. The Office Action cites column 6, lines 30. This section of DeKoning has nothing whatsoever to do with recited elements of claim 7.

For at least these reasons, claim 7 is allowable over DeKoning.

Claim 13

As a first example, claim 13 recites a storage device that has "a series of processes configured to count jobs received, completed, and passed on by each process." In other words, the processes count three different aspects: (1) jobs received, (2) jobs completed, and (3) jobs passed on. Does DeKoning teach processes that count these three different jobs? DeKoning does not.

The Office Action cites column 6, lines 9-17. This section of DeKoning discusses that disk array controller receives and completes requests and transfers data between a host and an array. This section never states that the controller **counts** (1) jobs received, (2) jobs completed, and (3) jobs passed on. Granted, the controller in DeKoning receives and completes jobs. However, DeKoning never states or even suggest that this same controller "counts" the jobs received, completed, and passed on. **The Office Action is ignoring words in claim 13.**

For at least these reasons, claim 13 and its dependent claims are allowable over DeKoning.

As a second example, claim 13 recites "a set of counters to track numbers of jobs received, completed, and passed on by each process in the series of processes." DeKoning does not teach a set of counters that tracks these jobs.

The Office Action cites column 6, lines 22-36 in DeKoning. This section of DeKoning teaches an RSCU that receives I/O requests and then calculates "the amount of data which each I/O request requires to be transferred between the host 42 and the array 46." Where are the counters to track (1) jobs received, (2) jobs completed, and (3) jobs passed on? Such counters do not exist in DeKoning.

For at least these reasons, claim 13 and its dependent claims are allowable over DeKoning.

As a third example, claim 13 recites a controller that "compares from the counters the number of jobs received versus the sum of the number of jobs completed and passed on by each process." In other words, the controller performs a comparison between (1) the number of jobs received and (2) a sum of the number of jobs completed and passed on by each component. Nowhere does DeKoning teach a controller that compares these claim elements. Instead, DeKoning teaches a controller that tracks "the size" of I/O requests.

The Office Action cites column 7, lines 1-51 and 55-56. These sections of DeKoning teach how to optimize the throughput in the controller by adjusting or tuning the size of the I/O requests. In one embodiment, DeKoning uses a static approach wherein optimal values for LARGE I/O SIZE and NCLIOP are stored for every possible combination of host channel speed, drive channel speed, XOR engine speed, etc. (see column 7, line 52 – column 8, line 12). In another embodiment, DeKoning teaches a dynamic approach (see column 8, lines 13 +).

In column 7, DeKoning provides details how its microprocessor allocates memory space, controls data transfer between the host and buffer, and performs other standard processing functions. Regardless, nowhere does column 7 teach that a controller performs a comparison between two specific elements: (1) the number of jobs received and (2) a **sum of the number of jobs completed and passed on** by each component.

In short, DeKoning does not teach a controller that performs a comparison of the elements recited in claim 13. In order for a prior art reference to be anticipatory under 35

U.S.C. § 102 with respect to a claim, "[t]he elements must be arranged as required by the claim," see M.P.E.P. § 2131, citing *In re Bond*, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990).

For at least these reasons, claim 13 and its dependent claims are allowable over DeKoning.

Claim 14

Claim 14 recites that the counters "record particular jobs received, completed, and passed on at each counter." DeKoning does not teach counters that record these elements. The Office Action cites column 6, lines 22-36 in DeKoning. This section of DeKoning teaches an RSCU that receives I/O requests and then calculates "the amount of data which each I/O request requires to be transferred between the host 42 and the array 46." Where are the counters to record (1) jobs received, (2) jobs completed, and (3) jobs passed on? Such counters do not exist in DeKoning.

For at least these reasons, claim 14 is allowable over DeKoning.

Claim 24

As one example, claim 24 recites a means for "counting a number of jobs received, completed, and passed on by processes in a controller of the storage device." The specification provides at least one exemplary embodiment as counters. DeKoning does not teach these means.

The Office Action cites column 6, lines 22-36 of DeKoning. This section of DeKoning teaches an RSCU that receives I/O requests and then calculates "the amount of data which each I/O request requires to be transferred between the host 42 and the array 46." Nowhere does this section teach any means for counting (1) jobs received, (2) jobs completed, and (3) jobs passed on.

For at least these reasons, claim 24 and its dependent claims are allowable over DeKoning.

As a second example, claim 24 recites "means for determining if a number of jobs completed and passed on is sufficient for a number of jobs received by each process." The specification provides at least one exemplary embodiment as a controller. Nowhere

does DeKoning teach this means. Instead, DeKoning teaches a controller that tracks "the size" of I/O requests.

The Office Action cites column 7, lines 1-51 and 55-56. These sections of DeKoning teach how to optimize the throughput in the controller by adjusting or tuning the size of the I/O requests. In one embodiment, DeKoning uses a static approach wherein optimal values for LARGE I/O SIZE and NCLIOP are stored for every possible combination of host channel speed, drive channel speed, XOR engine speed, etc. (see column 7, line 52 – column 8, line 12). In another embodiment, DeKoning teaches a dynamic approach (see column 8, lines 13 +).

In column 7, DeKoning provides details how its microprocessor allocates memory space, controls data transfer between the host and buffer, and performs other standard processing functions. Regardless, nowhere does column 7 teach that a controller for determining if a number of jobs completed and passed on is sufficient for a number of jobs received by each process

In short, DeKoning does not teach a controller that performs the recitations of claim 24. In order for a prior art reference to be anticipatory under 35 U.S.C. § 102 with respect to a claim, "[t]he elements must be arranged as required by the claim," see M.P.E.P. § 2131, citing *In re Bond*, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990).

For at least these reasons, claim 24 and its dependent claims are allowable over DeKoning.

Claim 25

Claim 25 recites "means for counting comprises a job log for jobs received, completed, and passed on by each process." The Office Action cites column 6, lines 22-36 of DeKoning. This section of DeKoning teaches an RSCU that receives I/O requests and then calculates "the amount of data which each I/O request requires to be transferred between the host 42 and the array 46." Nowhere does this section teach any means for counting (1) jobs received, (2) jobs completed, and (3) jobs passed on.

For at least these reasons, claim 25 is allowable over DeKoning.

II. Claim Rejections: 35 USC § 103(a)

Claims 9 and 26 are rejected under 35 USC § 103(a) as being unpatentable over DeKoning in view of USPN 5,166,927 (Iida). Applicants respectfully traverse.

Claim 9 depends from claim 1, and claim 26 depends from claim 24. As shown in section I, DeKoning does not teach or even suggest all the elements of independent claims 1 and 24. Iida fails to cure the deficiencies of DeKoning. Thus, for at least the reasons provided in section I with respect to respective independent claims 1 and 24, dependent claims 9 and 26 are allowable over DeKoning and Iida.

III. Claim Rejections: 35 USC § 103(a)

Claim 18 is rejected under 35 USC § 103(a) as being unpatentable over DeKoning in view of USPN 5,459,866 (Akiba). Applicants respectfully traverse.

Claim 18

As a first example, claim 18 recites "tracking a number of jobs received, jobs completed, and jobs passed on by the process." In other words, claim 18 tracks three different aspects: (1) jobs received, (2) jobs completed, and (3) jobs passed on. Does DeKoning teach or suggest tracking these three different jobs? DeKoning does not.

The Office Action cites column 6, lines 22-39. DeKoning discusses that a disk array controller receives and completes requests and transfers data between a host and an array. This section never states or even suggests that the controller **tracks** (1) jobs received, (2) jobs completed, and (3) jobs passed on. Granted, the controller in DeKoning receives and completes jobs. However, DeKoning never states or even suggests that this same controller "tracks" the jobs received, completed, and passed on. **The Office Action is ignoring words in claim 18.**

For at least these reasons, claim 18 and its dependent claims are allowable over DeKoning in view of Akiba.

As another example, claim 18 recites "comparing the number of jobs received by the process with the number of jobs completed and passed on the process." In other words, claim 18 performs a comparison between (1) number of jobs received and (2) the

number of jobs completed and passed on. Does DeKoning teach or suggest this comparison? DeKoning does not.

The Office Action cites column 7, lines 1-51 and 55-56. These sections of DeKoning teach how to optimize the throughput in the controller by adjusting or tuning the size of the I/O requests. In one embodiment, DeKoning uses a static approach wherein optimal values for LARGE I/O SIZE and NCLIOP are stored for every possible combination of host channel speed, drive channel speed, XOR engine speed, etc. (see column 7, line 52 – column 8, line 12). In another embodiment, DeKoning teaches a dynamic approach (see column 8, lines 13 +).

In column 7, DeKoning provides details how its microprocessor allocates memory space, controls data transfer between the host and buffer, and performs other standard processing functions. Regardless, nowhere does column 7 teach that a controller performs a comparison between two specific elements: (1) the number of jobs received and (2) a **number of jobs completed and passed on** by each component.

In short, DeKoning does not teach a controller that performs a comparison of the elements recited in claim 18.

For at least these reasons, claim 18 and its dependent claims are allowable over DeKoning in view of Akiba.

IV. Claim Rejections: 35 USC § 103 (a)

Claims 19 – 23 are rejected under 35 USC § 103(a) as being unpatentable over DeKoning in view of Akiba. Applicants respectfully traverse.

Claims 19 - 23 depend from claim 18. As shown in section III, DeKoning in view of Akiba do not teach or even suggest all the elements of independent claim 18. Thus, for at least the reasons provided in section III with respect to respective independent claim 18, dependent claims 19-23 are allowable over DeKoning and Akiba.

CONCLUSION

In view of the above, Applicants respectfully request the Board of Appeals to reverse the Examiner's rejection of all pending claims.

Any inquiry regarding this Amendment and Response should be directed to Philip S. Lyren at Telephone No. 832-236-5529. In addition, all correspondence should continue to be directed to the following address:

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Respectfully submitted,

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VIII. Claims Appendix

1. A storage device comprising:

a controller configured to receive jobs from a source;

a set of components that receive, complete, and pass on jobs; and

job flow analysis devices configured to the controller to track the number of jobs received, completed, and passed on by each component, wherein the controller compares the number of jobs received with a sum of the number of jobs completed and passed on by each component.

2. The storage device of claim 1 wherein the controller is further configured to perform a corrective action on the storage device and request from the source the jobs when the number of jobs received is greater than a sum of a threshold amount plus the number of jobs completed and passed on by one of the components.

3. The storage device of claim 1 wherein the set of components are arranged serially.

4. The storage device of claim 1 wherein the job flow analysis devices are comprised of job logs to record jobs received, completed, and passed on.

5. A method comprising:

determining a number of jobs received, completed, and passed on by a process;

comparing the number of jobs received by the process and a sum of the number of jobs completed and passed on by the process;

deciding whether the sum of a threshold amount and of the number of jobs completed and passed on is greater than the number of jobs received; and

performing a corrective action when the sum of the threshold amount and the number of jobs completed and passed on versus the number of jobs received is not acceptable.

6. The method of claim 5 wherein the comparing is performed over a common time period during which the numbers of jobs are received, completed, and passed on by the process.

7. The method of claim 5 wherein the determining is performed by a counter for the jobs received, a counter for the jobs completed, and a counter for the jobs passed on.

8. The method of claim 7 wherein the determining is further comprised of tracking the jobs in job logs included in the counters.

9. The method of claim 5 wherein the determining comprises performing a bandwidth analysis at an input where the jobs are received, at an output of where the jobs are completed, and at an output of where the jobs are passed on.

10. The method of claim 5 wherein the performing a corrective action comprises requesting for jobs to be resent from a source.

11. The method of claim 5 wherein the process is one of a set of serial processes that receive, complete, and pass on jobs.

12. The method of claim 5 further comprising accounting for any conditions that affect job flow other than input and output to the process and performing corrective action.

13. A storage device comprising:

a series of processes configured to count jobs received, completed, and passed on by each process;

a set of counters to track numbers of jobs received, completed, and passed on by each process in the series of processes; and

a controller that compares from the counters the number of jobs received versus the sum of the number of jobs completed and passed on by each process.

14. The storage device of claim 13 wherein the set of counters are comprised of job logs to record particular jobs received, completed, and passed on at each counter.

15. The storage device of claim 13 wherein the jobs are received from a device which communicates with the storage device.

16. The storage device of claim 13 wherein the controller tracks conditions that affect job flow other than input and output to the processes and performing corrective action.

17. A system that comprises the storage device of claim 13.

18. A processor-readable medium comprising processor-executable instructions for analyzing job flow in a process, the processor-executable instructions comprising instructions for:

tracking a number of jobs received, jobs completed, and jobs passed on by the process;

comparing the number of jobs received by the process with the number of jobs completed and passed on the process; and

determining a discrepancy whenever the number of jobs received by the process exceeds the number of jobs completed and passed on the process.

19. The processor-readable medium of claim 18 wherein the tracking is performed for an expected amount of time for which the jobs are to be completed.

20. The processor-readable medium of claim 18 wherein the process is part of a set of serial processes.

21. The processor-readable medium of claim 18 wherein the instructions further comprise performing a corrective action when the process when a discrepancy is determined.

22. The processor-readable medium of claim 21 further comprising requesting for a complete set of jobs to be received when performing the corrective action on the process.

23. The processor-readable medium of claim 21 further comprising requesting for jobs awaiting to be processed when the corrective action is performed.

24. A storage device comprising:

means for counting a number of jobs received, completed, and passed on by processes in a controller of the storage device;

means for determining if a number of jobs completed and passed on is sufficient for a number of jobs received by each process;

means for resetting the processes; and

means for requesting for the jobs to be resent to the processes.

25. The storage device of claim 24 wherein the means for counting comprises a job log for jobs received, completed, and passed on by each process.

26. The storage device of claim 24 wherein the means for counting is performed by bandwidth analysis for jobs inputted to, and completed and passed on as output by each process.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.